



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

# User Guide for DEA Solid Waste Tariff Model v1.5

**DEA SOLID WASTE TARIFF MODEL - HOME PAGE**

**Model information**

Municipality

Model Run

Year 0  representing the -1/ financial year

**Overall tariff objective**

**Guide to model formatting**

<input type="text"/>	Base data - cells must be filled in by the user
<input type="text"/>	Drop-down list - user must select appropriate option
<input type="text"/>	Calculated cells
<input type="text"/>	Cells where data need not be entered
<input type="text"/>	Default or calculated values

**HOME PAGE**

Consumers

Service Levels

Waste Facilities

Finance

Tariffs

Operating Account

Targets

Unit Costs

Waste Generation

Tariff Projection

Other Outputs

## Contact Details

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### PDG

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# **Introduction**

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## **Background to the Model**

The Solid Waste Tariff Model has been produced by the Department of Environmental Affairs as a tool to assist municipalities with the setting of solid waste tariffs, in line with the objectives of the National Waste Management Strategy. It is to be read in conjunction with the Solid Waste Tariff Strategy and the Solid Waste Tariff Setting Guidelines for Local Authorities.

The model is a Microsoft Excel-based spreadsheet model for Excel version 2007 or newer. It includes macros, and thus macros must be enabled in order for the model to run (see section on 'Enabling Macros').

This user guide is not a comprehensive user manual for the operation of the model. Detailed guidance is contained in text boxes through out the model to indicate where and what user input is required. This guide therefore serves as additional explanatory information only. For further assistance, contact the Department of Environmental Affairs using the contact details provided on the title page.

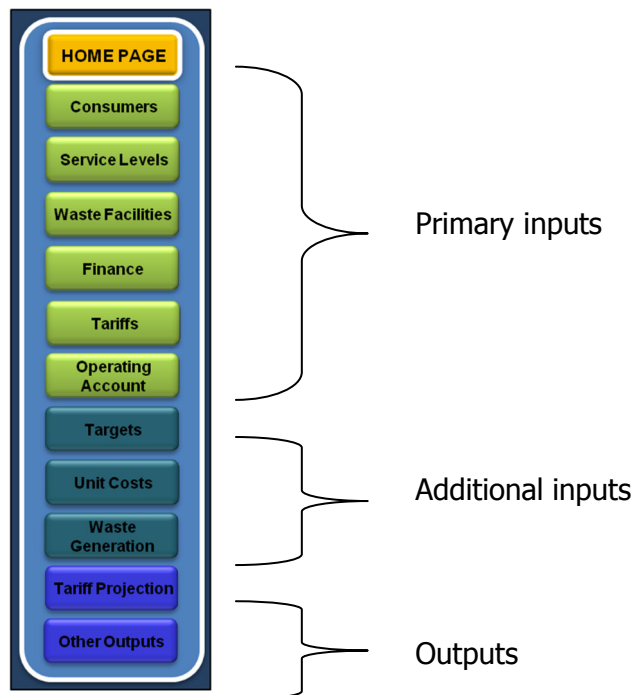
It is assumed that users have a working knowledge of MS Excel and that they are familiar with solid waste management processes and municipal finance.

## **Purpose of the Model**

The model is applicable for local municipal solid waste services. It enables municipalities to project tariffs necessary to achieve strategic financial objectives as set out in the home-page. The model is useful in investigating the financial implications of any technical changes to the solid waste service and identifying any inefficiencies in the system. The model can be used for planning and to gain a long-term strategic vision of the financial sustainability of the solid waste service.

## **Basic Model Process and Concepts**

The Excel model is portrayed as a webpage and each section can be navigated to using the navigation bar on the left side of each page. The user must begin at the home page, after which the user must work through each of the primary input pages. These are compulsory inputs and the model output is reliant on these being filled in. The user can then check the additional input pages. These pages are not obligatory; however users are encouraged to go through them.



The outputs of the model are found on the Tariff Projection and Other Outputs pages.

The buttons indicated below are used to assist the user in navigating the model. The 'top' button will take the user back to the top of the page, whilst the 'next' button takes the user to the next page to be completed.

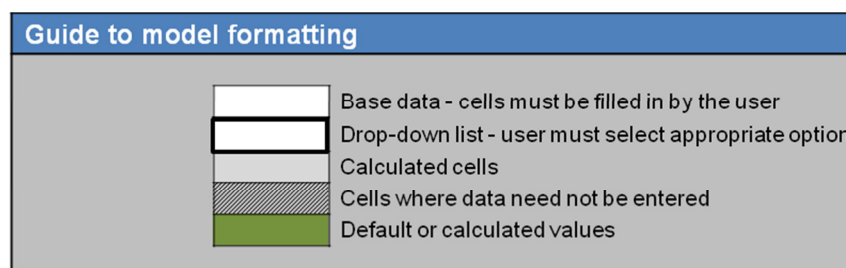


It is important to remember these basic model concepts when using the model.

1. All values are in **real** terms (base year Rands). This means that inflation is **excluded** from all the model outputs, except where it is explicitly stated that the figures are **nominal**.
2. Most figures are entered in **R'000s** (e.g. R2 million would be entered as 2000).
3. Default values (e.g. unit costs and waste generation rates) are 'rough starting points' only. **These values will not be correct for your specific municipality and need to be over-written if better information is available.** If not, then the unit costs can be adjusted and updated to calibrate the model
4. Unit costs incorporate all overheads (i.e. full cost accounting), but not indirect costs (interest, depreciation and provision for bad debt).
5. The model calculates *average* tariff increases, which will apply to all tariffs. If the user wishes to increase one tariff more than another, then this must be adjusted manually.
6. There are information text boxes on the right hand side of each page to assist the user in using the model, as well as pop-up information boxes in certain input cells.

7. Never use commas or spaces for indicating thousands or decimals. It is also necessary to enter 'R' before Rand amounts. All amounts are to be entered as straight numbers, with a dot (.) for decimals, where required.

The guide to model formatting indicates which cells must be completed by the user. Only the white cells and the white cells with a bold black border must be filled in by user.



The grey coloured cells have been calculated by the model and the green cells are default values. These cells are locked and cannot be altered by the user. If a cell is hatched, it means that the model does not require the user to fill in any information. The password to unlock sheets is **pdg**. To unlock a sheet go to Review – Unprotect Sheet and enter the password. Users are free to modify / improve the model for their own use, but the integrity of the model and the results cannot be guaranteed by DEA.

## Enabling macros

The first step when using the model is to ensure that macros are enabled in your version of MS Excel. To do this, follow the instructions below:

### If using MS Excel 2007:

- Click round Office button (top left)
- Click Excel Options (bottom right)
- Click Trust Centre
- Click Trust Centre Settings (far right)
- Click ActiveX settings (left hand menu) – Select “enable all controls”
- Click Macro setting (left hand menu) – Click “enable all macros”
- Click OK
- Click OK

### If using MS Excel 2010:

- If you have a yellow bar that says “enable content” just click this. If not, then:
- Click File (top left)
- Click Options
- Click Trust Centre
- Click Trust Centre Settings (far right)
- Click ActiveX settings (left hand menu) – Select “enable all controls”
- Click Macro setting (left hand menu) – Click “enable all macros”
- Click OK

# Homepage

*Purpose:* To select the municipality the user wishes to model and to decide upon an appropriate overall tariff objective.

**Figure 1: Homepage**

The screenshot displays the 'DEA SOLID WASTE TARIFF MODEL - HOME PAGE'. On the left is a vertical navigation bar with buttons for 'HOME PAGE', 'Consumers', 'Service Levels', 'Waste Facilities', 'Finance', 'Tariffs', 'Operating Account', 'Targets', 'Unit Costs', 'Waste Generation', 'Tariff Projection', and 'Other Outputs'. The main area is divided into three sections: 'Model information' with input fields for 'Municipality' and 'Year 0' (set to 2012), 'Overall tariff objective' with a drop-down menu currently showing 'Full cost recovery', and 'Guide to model formatting' which includes a legend for cell types: white for 'Base data', light blue for 'Drop-down list', green for 'Calculated cells', and grey for 'Cells where data need not be entered'. To the right of these sections are instructional text boxes. At the bottom of the main area are 'TOP' and 'NEXT' buttons. A status bar at the bottom of the window shows the current page as 'HOME' and other available pages like 'CONSUMERS', 'SERVICE LEVELS', 'WASTE FACILITIES', 'FINANCE', 'TARIFFS', 'OPERATING', 'Targets', 'Unit cost', and 'Other outputs'.

## Essential inputs

This page requires three compulsory actions:

1. Using the drop-down box, a municipality must be selected. To access the drop-down menu, select the cell and then click on the small arrow that appears on the right of the cell. This applies to all drop-down menus in the model. A municipality must be selected and no other entry is allowed in this cell. Only **local** municipalities are included.
2. The base-year must be filled in.
3. The overall tariff objective must be selected. This financial decision will influence the output of the model on the Tariff Projection page.

The user has the option providing an explanation for the model run. This is useful if multiple versions of the model are going to be saved.

Using the navigation bar or the next button, the user must proceed to the primary input pages.

# Consumers

*Purpose:* To understand the municipality's consumer profile

**Figure 2: Consumers Page**

A	B	C	D	E	F	G	H
<div>HOME PAGE</div> <div>Consumers</div> <div>Service Levels</div> <div>Waste Facilities</div> <div>Finance</div> <div>Tariffs</div> <div>Operating Account</div> <div>Targets</div> <div>Unit Costs</div> <div>Waste Generation</div> <div>Tariff Projection</div> <div>Other Outputs</div>	<div>CONSUMERS 0</div>						
	<div>Key demographics</div>						
	Population		default	updated value			
	Number of households		3 090 117				
	Average household size (persons/hh)		786 745				
	Consumer units (CUs)		3.93				
	Total		724 780				
	Low income		514 526	-			
	High income		210 253	-			
	<div>Household income profile</div>						
	R/hh/month	From	To	default	updated value		
		R 0	R 1 600	57%			
		R 1 600	R 3 200	15%			
		R 3 200	R 6 400	12%			
		R 6 400	more	16%	100%		
Household income cut-off for subsidisation (indigents)				= 0 CUs			
Property rates exemption threshold (R)			15 000				
Residential property rates charge (cents in the Rand)			0.800				
<div>Non-residential Information</div>							
	Default no. of non-res consumers		Total no. of non-res consumers	No. served by municipality			
Round Collected Waste (RCW)	-						
Demand Collected Waste (DCW)	-						
		TOP		NEXT			

HOME

CONSUMERS

SERVICE LEVELS

WASTE FACILITIES

FINANCE

TARIFFS

OPERATING

Targets

Unit Costs

Default population figures are based on Census 2001 data. If the municipality has access to better data, this data can be placed in the adjacent white cells.

The model operates on Consumer Units (CUs) as the units that are served by the municipality. In formal areas this generally equates to an erf, but in informal areas this may relate to a dwelling. There may be more than one household per consumer unit. For areas with communal facilities (e.g. skips) the number of CUs is equal to the number of erven or dwellings, not to the number of skips.

Default income distribution figures are based on Census 2001 data. If the municipality has access to better data, this data can be placed in the adjacent white cells.

Round Collected Waste: Collection according to a regular time schedule. Default assumes that 10% of all CUs in a municipality are non-residential. This should be corrected in the white cell if this figure is known.

Demand Collected Waste: Ad hoc service - customers usually order containers from the municipality to collect when full. Default is zero and the

## Essential inputs

### Key demographics and Household Income Profile

If the user has more accurate information on the key demographics and household income profile of the municipality, then the default values (taken from Census 2001) can be overwritten by filling in the updated values in the adjacent white cells. If the user does not have access to better information, these white cells can be left blank.

The municipality *must* remember to select the household income cut-off for subsidisation.

### Non-residential information

It is also imperative that the cells pertaining to the non-residential consumers are filled in. The municipality must differentiate between the total number of non-residential consumers, and those that are served by the municipality.

### Potential problem areas:

1. The model operates in consumer units
2. Remember that the total number of non-residential consumers must be greater than the number of non-residential consumers served by the municipality.

# Service Levels

*Purpose:* To identify the activities undertaken by the municipality and to quantify the amount of waste generated at each point in the overall system

**Figure 3: Service Levels Page**

**SERVICE LEVELS**

**Residential collection service levels**

Service Level	Service Provider	No of Cus	High income
No service			
Communal collection 1			
Communal collection 2			
Food-for-waste			
Community contractors 1			
Community contractors 2			
Principal contractors 1			
Principal contractors 2			
Kerbside collection 1			

At least one service level must be entered. Service levels must be from lowest to highest level of service.

**Residential collection of recyclables**

Service Level	Service Provider	No of Cus

**Non-residential service levels**

**Round collected waste (RCW)**

Service Level	Frequency	No of Service Points

**Demand collected waste (DCW)**

tons/annum: default, updated value

Non-res waste as % of residential waste: 33%, updated value

**Public cleansing service levels**

Service Provider	tons/annum
Street Cleaning	
Area Cleaning (including illegal dumping)	
Total	

Percentage of public cleansing waste generated by residential and non-residential consumers: default, updated value

Residential: 50%, updated value

## Essential inputs:

### Residential Collection

The residential collection service levels that are offered in the municipality be filled in. The user must select the most applicable service levels by using the drop-down box as indicated in Figure 3. The drop-down menu provides a number of options for the same level (e.g. kerbside collection 1, kerbside collection 2, kerbside collection 3), which can be used if the municipality undertakes more than one type of kerbside collection, but with different costs (e.g. collection wheelie bins with a compactor truck vs. collection black bags in an open truck). The user must take note which service levels relate to which service in their specific municipality. The service provider must then be selected and the options range from 'municipality' to 'full contract' to a mixture of both. Lastly, the corresponding number of consumer units who receive the service must be entered.

The model automatically calculates the number of consumer units who receive no service as the residual. The number of high income consumers who do not receive a service must be entered in the space provided.

The municipality has the option of setting future residential collection targets by pressing the adjacent "set future targets" button. The municipality may wish to eradicate service level backlogs or make changes to current service levels and these targets can be set on the Targets page.

### Residential Collection of Recyclables

If the residential collection of recyclables (i.e. a dedicated second round of collection in addition to normal collection) takes place in the municipality, the name of each service level offered must be filled in. The service provider must be selected in the



adjacent cell and the corresponding number of consumer units served must be filled in.

If there are no recycling activities currently taking place, but the municipality wishes to introduce future recycling services, the user must fill in a name for this future recycling activity. The future service provider must also be selected; however a zero must be entered as the number of consumer units receiving this service. Future targets on this service level can then be set by pressing the adjacent 'set future targets' button.

#### *Non-Residential Consumers*

Non-residential consumer services are split between 'Round Collected Waste' (RCW) and 'Demand Collected Waste' (DCW). The user must provide a name for the RCW service that is offered by the municipality, and enter the frequency of collection and the corresponding number of consumer units in the adjacent cells. The amount of waste collected per annum is required for the DCW service.

Targets pertaining to non-residential consumers can be set by pressing the adjacent 'set future targets' button.

#### *Public Cleansing Service Levels*

The responsibility of street and area cleaning must be allocated to a service provider. The estimated amount of waste collected per annum must also be filled in.

The model assumes that the public waste generated is split equally between residential and non-residential consumers. If the user is aware that this is not the case, the updated percentage split can be entered in the white cell provided.

#### *Potential problem areas:*

1. The residential service level must be filled in from lowest to highest
2. The first row becomes red if the number of consumers entered in is more than the number entered on the Consumers page. Either decrease the number of consumers on the Service Levels page, or increase the number of consumers on the Consumers page.

# Waste Facilities

*Purpose:* To assess the technical options

**Figure 4: Waste Facilities Page**

**WASTE FACILITIES**

**Vehicles**

Ownership of vehicle:

Current replacement cost (CRC) of existing vehicle (R'000):  default  updated value

Average useful life of all existing vehicle (years):  10

Average age of existing vehicle (years):  5

**Transfer stations**

Are transfer stations used?

Municipally collected waste delivered to transfer station:  ton/annum

Other waste delivered directly to transfer station:  ton/annum

Total waste through transfer station:  ton/annum

% of other waste which is not chargeable:  10%

**Recycling**

Are reclamation/recycling facilities used?

Municipal collected waste diverted to reclamation facility:  ton/annum

Other recycled waste dropped off directly:  ton/annum

% non-recyclable material returned to waste stream:  10% default  updated value

Municipal responsibility for reclamation facilities:  Private  100%

Does the municipality reclaim/recycle material?

Average sale price of reclaimed/recycled material (R/ton):  200

**Landfill**

Landfill waste destination:

% of waste collected going to own landfill:  ton/annum

Other waste delivered directly to municipal landfill:  ton/annum

Total remaining municipal airspace available (to beginning of yr0):  m<sup>3</sup>

Calculated:  SDIWF0:  ton/annum

Actual:  SDIWF0:  ton/annum

Total mass of waste disposed of at own landfill:  SDIWF0:  ton/annum

Total mass of waste disposed of at other landfill:  SDIWF0:  ton/annum

Total waste to landfill:  SDIWF0:  ton/annum

% of waste accepted at landfill which is not chargeable?  5%

Volume density of waste disposed:  0.8 ton/m<sup>3</sup>

**Waste-to-energy (WTE)**

Do you have waste-to-energy facilities?

**Buttons:** Set future targets, Balance landfill mass, Undo mass balance

**Navigation:** HOME, CONSUMERS, SERVICE LEVELS, WASTE FACILITIES, FINANCE, TARIFFS, OPERATING, Targets, Unit Costs

*Essential inputs:*

*Vehicles*

The ownership of the vehicle, their current replacement cost needs to be filled in. If the user has better information regarding the average age and average useful life of the vehicles, updated values can be placed in the adjacent white cells.

*Transfer Stations*

The municipality must choose whether they have transfer stations. Transfer station is a broad term which covers any facility that involves the transfer of waste from one vehicle to another, including informal drop offs, garden refuse dumps and recycling depots. If the municipality has no transfer stations, the relevant cells will be hatched out and the user must move to the next section. On the other hand, if the municipality answers 'yes,' then the user must fill in the amount of municipal-collected waste and the amount of other waste that is delivered to the transfer station each year.

If the municipality knows the percentage of other waste that is not charged, the default value can be overwritten by entering the updated value in the adjacent white cell.

If the municipality wants to set targets pertaining to the future utilisation of transfer stations, the blue 'set future targets' button must be pressed.

### *Recycling*

If the municipality has recycling facilities, then the amount of municipal-collected waste and the amount of other waste that is delivered to the reclamation facility each year must be entered.

The model assumes that 11% of non-recyclable residue is returned to the waste stream; however this can be overwritten if the municipality has access to better information. The user must enter the municipality's responsibility regarding the reclamation facilities. The user has to choose whether the municipality sells the recycled material and if 'yes' is selected, the user has the option of updating the average sale price.

The municipality can set future targets regarding reclamation facilities by pressing the 'set future targets' button.

### *Landfill*

The landfill waste destination must be selected from the given options. Depending on what option is selected, certain cells will be hatched out. The remaining white cells must be filled in.

If the user knows the total mass of waste disposed at the landfill, then the updated figure can be entered in the white cell next to the default value. The user must then press the 'balance landfill mass' button to calibrate the model. Do not press the balance landfill mass if no updated figure has been entered in the white cell. If you have already done so, press the 'Undo balance landfill mass button'.

Landfill targets can be set by pressing the 'set future targets' button.

### *Waste-to-energy Facility (WTE)*

If the municipality has a WTE facility, then the amount of waste supplied to the plant, the current power generation capacity and the municipal responsibility needs to be entered. If the municipality plans to have a WTE facility, or would like to model a scenario in which such a facility is used in future, then press the 'set future targets' button.

### *Landfill gas-to-energy (LGTE)*

If the municipality has LGTE, then the current landfill volume flared, the current power generation capacity and proportion of municipality responsibility needs to be filled in. If the municipality plans to have a LGTE facility, or would like to model a scenario in which such a facility is used in future, then press the 'set future targets' button.

### *Potential problem areas*

1. The current replacement cost of the vehicles must be entered in R'000.
2. 'Other' waste describes all non-municipal collected waste that is delivered that is delivered directly to the relevant waste facilities.
3. Do not press the 'balance landfill mass button' if no actual landfill mass has been entered into the white cells.

# Finance

*Purpose:* To take into account the financing of the solid waste service by identifying revenue sources

**Figure 5: Finance page**

**FINANCE**

**Financial assumptions**

**Historic Debt**

Debt outstanding in base year (R'000)  default updated value

Cost of Capital - Historic Debt  0%

Average repayment period remaining (years)  5

**New debt**

Cost of Capital - New Debt  10%

Average repayment period (years)  10

Inflation projection  6%

**Capital funding (R'000)**

Source of capital funding	2012	2013	2014
MIG/USDG for solid waste (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other capital grants for solid waste (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Own capital reserves (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>

**Operating subsidies (R'000)**

Source of operating subsidies	2012	2013	2014
Equitable share allocation for solid waste (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Other operating grants for solid waste (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Total operating subsidies (R'000)	<input type="text"/>	<input type="text"/>	<input type="text"/>
ES Income available per indigent CU (R/CU/month)	<input type="text"/> #DIV/0!		

**TOP NEXT**

## Essential inputs:

### Financial Assumptions

The debt outstanding in the base year (for the solid waste department only) needs to be entered in the white cell. Unless the user has more accurate information regarding the other financial assumptions, the other white cells can be left blank.

### Capital Funding

The amount received from the various capital funding sources must be entered where relevant.

### Operating Subsidies

The amount received from the various operating subsidies must be entered in the white cells.

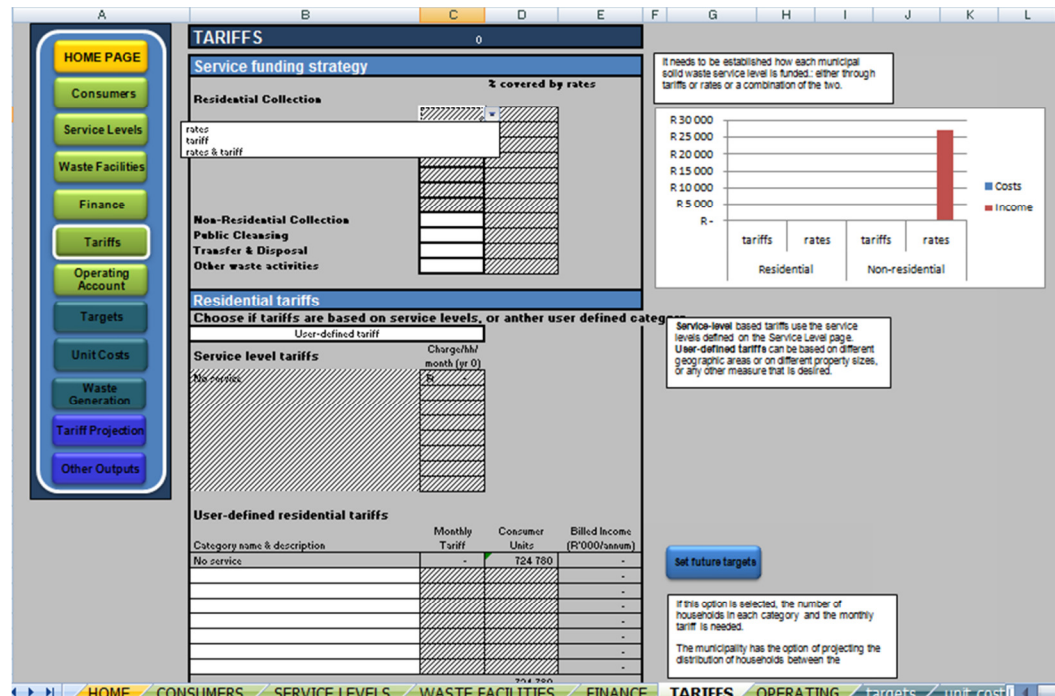
## Potential problem areas:

1. Remember that the historic debt, capital funding and operating subsidies must be entered in R'000s.
2. The amounts entered in the capital funding and operating subsidies must relate to solid waste only.

# Tariffs

*Purpose:* To select the appropriate tariff option to finance solid waste services

**Figure 6: a selection of the Tariffs page**



## Essential inputs:

### Service funding strategy

Depending on what type of activities selected on the Service Levels page, the corresponding funding strategy needs to be selected. The user must choose between the financing the activity through tariffs, rates or a mixture of both rates and tariffs. If a mixture of rates and tariffs is selected, the % recovered by rates must be given, based on the user's own calculations/estimates.

### Residential tariffs

The user must then decide whether the residential tariffs are based on service levels or another user-defined category.

If the 'service level tariff' option is selected, then the monthly charge per household for each service level must be filled in. If the 'user-defined tariff' is selected, the category name, the monthly tariff and the corresponding number of consumer units must be filled in.

### Non-residential Tariffs

The user must fill in the annual basic charge (if applicable) and/or the charge per cubic metre of waste. If a basic charge is applied, the user must select whether the basic charge applies to all non-residential consumers, or only those serviced by the municipality.

### Disposal

If the municipality charges a disposal charge for delivering waste directly to the transfer station or landfill site, this must be filled in the white cell provided.

# Operating Account

*Purpose:* To align the model to the actual solid waste budget

**Figure 7: Operating Account page**

Current expenditure (2011/2012)		
	R'000	
	Calculated Actual	
Total operating expenditure	648 645	
of which:		
Non-operational expenditure (education, marketing, etc)		
Provision for bad debt		
Depreciation	82 012	
Interest	8 875	
Contributions to capital reserves		

Current income (2011/2012)		
	R'000	
	Calculated Actual	
User charges		
- Residential	381 130	
- Non-Residential	68 880	
Total user charges	460 010	
Rates income		
- Residential	78 918	
- Non-Residential	27 060	27 060
Total transfer from rates account	105 976	27 060
Disposal charges	806	
Operating subsidies	232 451	232 451
Other income	21 387	
TOTAL INCOME	820 550	741 633
SURPLUS / DEFICIT	271 905	741 633

## Essential inputs:

### Current expenditure

The actual operating expenditure for solid waste should be entered in the white cells. Note that this is the **full cost** of providing the service, including all overheads, corporate functions, interest, depreciation and provision for bad debt. This will need to be determined before using the tariff model.

If the user enters in the actual amount of depreciation, the user must then press the button called 'adjust depreciation.' This adjusts the model's calculated theoretical depreciation to match the actual depreciation entered. The same applies to the interest. If the actual amount of interest is entered, then the user must press the 'adjust interest' button to calibrate the model.

If the user wishes to use the figures entered in the white cells instead of the model defaults (recommended), the user must then press the 'balance operating costs' button to calibrate the model.

### Current income

The income transferred from the rates account should be entered in the white cells if this amount is known. Any other income should be entered in the relevant white cell.

The user has the choice of setting expenditure and income projections by pressing the blue buttons. This takes the user to the Targets page, where the future projections can be entered.

### Potential problem areas

1. Amounts must be entered in as R'000s.
2. The user must not press the 'balance operating costs' button unless actual figures have been entered into the white cells.

*Purpose:* To aid the municipality in planning and setting goals over a 10 year period

[illegible]

The target page falls within the additional input pages and therefore the user is not obliged to go through the page. Nevertheless, it is advised that the user reads through the page and sets relevant municipal targets if any aspect of the municipal service is likely to change over the next 10 years (excluding organic population growth,, which is already catered for in the model).







# Waste Generation

*Purpose:* To understand the amount of waste generated in the municipality

**Figure 10: Waste Generation page**

**Waste Generation**

**Economic growth assumptions**

Used to project waste generation	default	updated values
Economic Growth: Year 0	2.0%	
Economic Growth: Year 5	4.5%	
Economic Growth: Year 10	6.0%	

**Population growth assumptions**

Used to project service expansion	default	updated values
Low income	2.4%	
High income	0.5%	

**Municipal collection**

Average household waste generation rates: kg/OU/week

	default	updated values
No service	20.00	
Communal collection 1	16.70	
Communal collection 2	16.70	
Food-for-waste	22.00	
Community contractors 1	20.00	
Community contractors 2	20.00	
Principal contractors 1	20.00	
Principal contractors 2	20.00	
Kerb-side collection 1	36.00	
Kerb-side collection 2	36.00	
Kerb-side collection 3	36.00	

**Municipal collection of recyclables**

	default	updated values
0	10.00	
0	10.00	
0	10.00	

**Non-residential RCW generation**

	default	updated values
0	150	
0	150	
0	150	

Waste generation adjustment factor: 0.76

Waste generation rates are national rates taken from the DEA (2010) figures. If municipalities have their own rates, these can be placed in the adjacent white cells.

These unit generation rates refer only to waste put out for municipal collection. They do not include other wastes (hazardous, large items, recyclables) that are disposed of by alternative means.

## Essential inputs:

The Waste Generation page is not compulsory; however it might be interesting for the user to understand the waste generation assumptions used in the model. Waste generation rates are universally adjusted when the user presses the 'Balance landfill mass' button on the 'Waste Facilities' sheet. The adjustment factor is shown in the pink cell to the right of the page.

## Economic growth rate and population growth assumptions

Waste generation rates are based on economic growth and population growth rates. Default values are provided, however the municipality can overwrite these values if they wish.

## Municipal collection

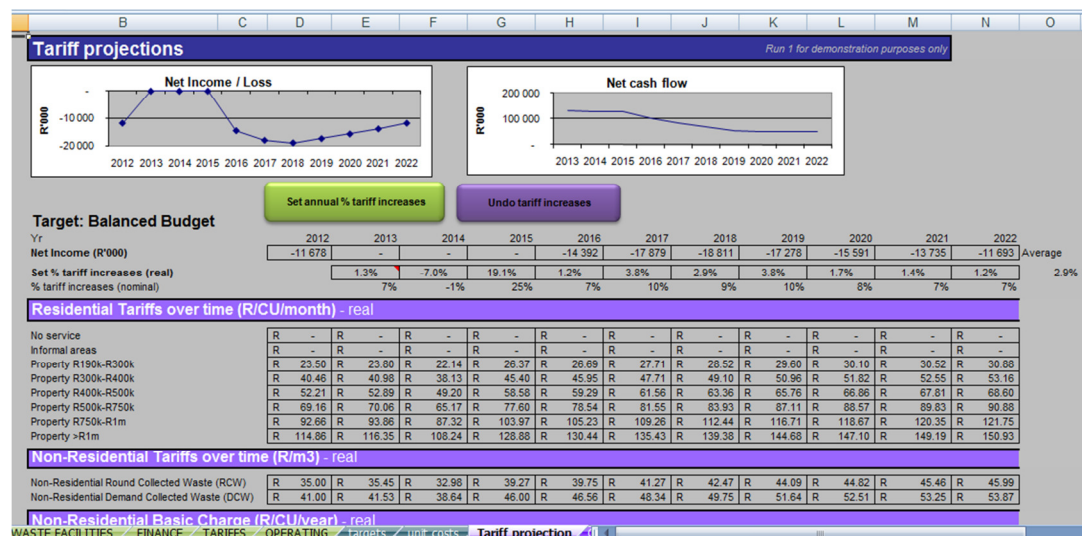
The waste generation rates are taken from the DEA (2010) figures. However, if the municipality has access to its own figures, these estimates can be updated by filling in the white cells.

# Outputs

## Tariff Projections

*Purpose:* To calculate future solid waste tariffs and to assist in setting percentage tariff increases

**Figure 11: Tariff Projection page**



The first row on this page indicates the net income per annum in addition to the average net income over 10 years.

The second row shows the tariff increases for each year over the model period. **This is the main output of the model.** The default situation is zero real tariff increases over the model period, i.e. the tariffs only increase by inflation, and therefore will stay exactly the same in real terms over the 10 year period. By clicking the green "set annual % tariff increases", the level of tariff increases required to meet your overall tariff objective (set on the Home page) will be shown.

The 'set % tariff increases (real)' row can also be overwritten and entered manually. This means that municipalities can choose more appropriate tariff increases and determine its impact on net income. To restore the default situation, the user must click on the 'undo tariff increases.'

The residential tariffs and non-residential tariffs and basic charges over time are shown in both real and nominal figures.

## Other Outputs

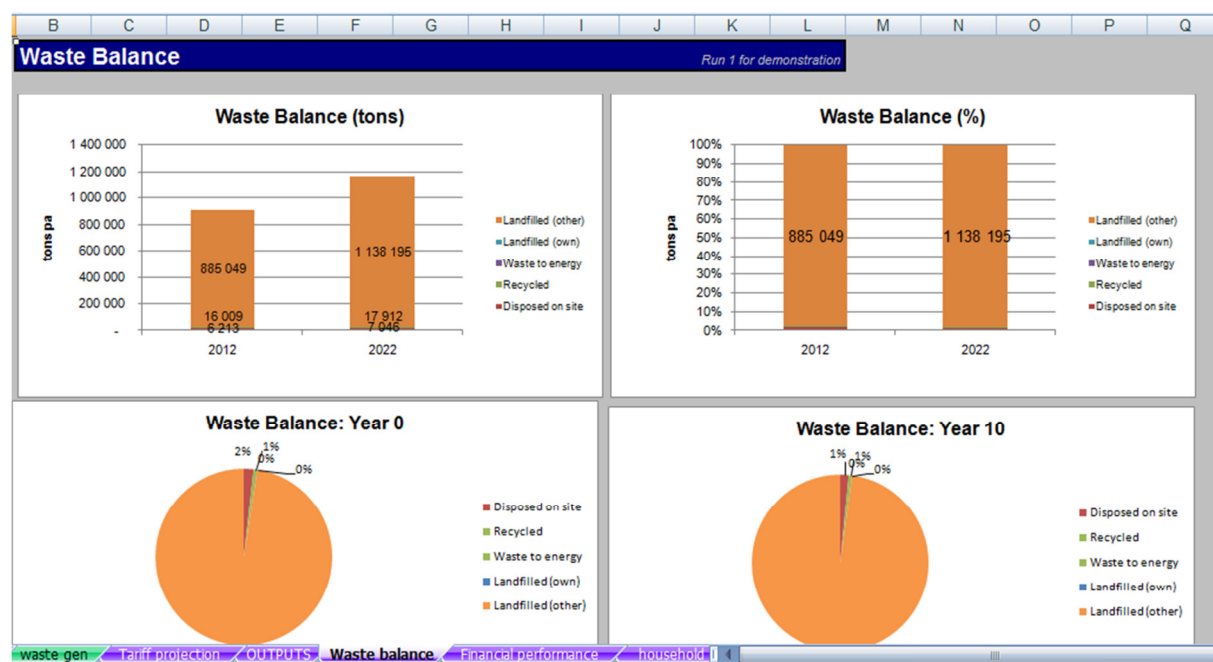
By clicking on the 'other outputs' button, a new home page will appear showing the model's other outputs.



## Waste Balance

The Waste Balance page illustrates what proportion of municipal solid waste ends up in the various destinations. It indicates the change in the waste balance over 10 years.

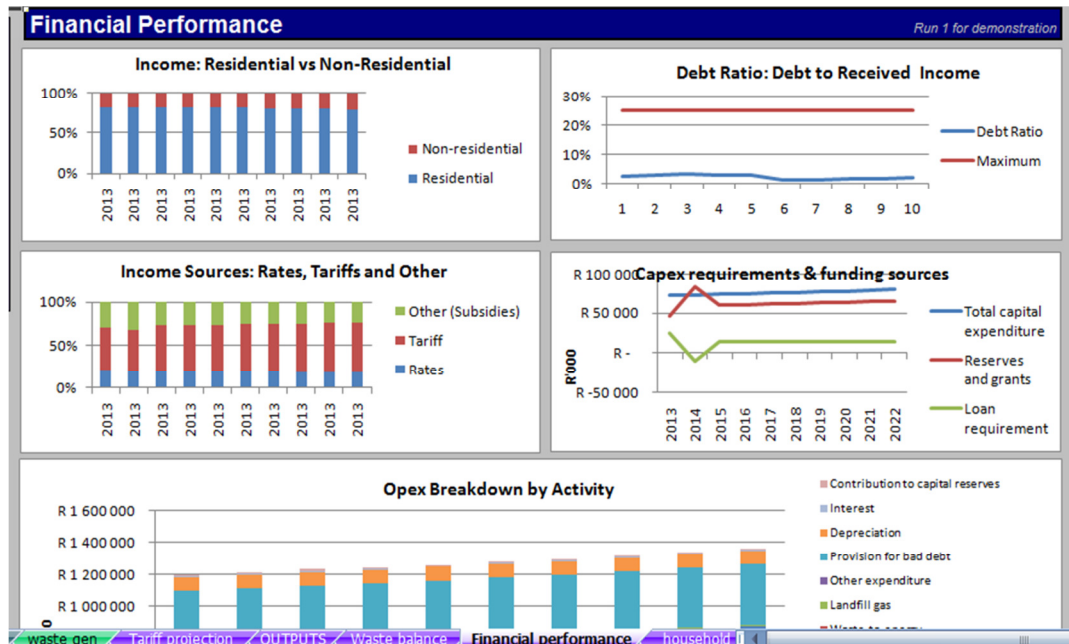
*Figure 12: Waste Balance*



## Financial Performance

The graphs illustrate the important financial performance indicators.

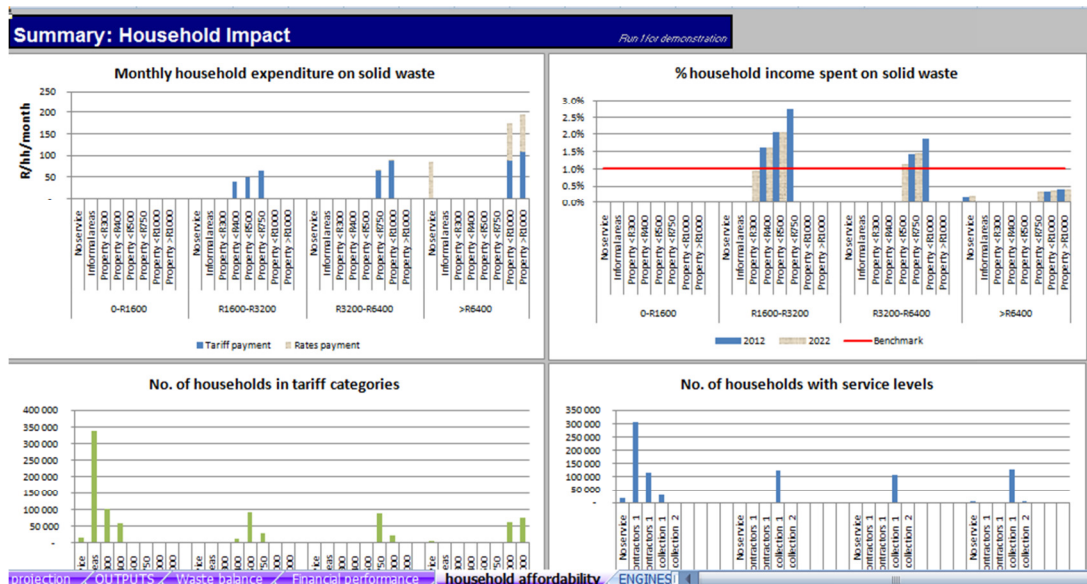
**Figure 13: Financial Performance**



## Household Impact

The Household Impact page shows the user the amount that households are spending on solid waste and also shows the proportion of household income that is spent on solid waste. It divides the households into different income categories and according to the different levels of service. This page helps the municipality to determine the cost implications of solid waste on poor households.

**Figure 14: Household Impact**



## Financials

The municipal financial statement over 10 years can be viewed on the Financials output page.

Figure 15: Financials

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
<b>Financial statements (R'000)</b>														Run / for demonstration
<b>Income statement</b>														
Initiation index	1	1.06	1.12	1.13	1.26	1.34	1.42	1.50	1.53	1.63	1.73			
<b>Income (billed)</b>	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022			
Residential income	339 602	346 827	354 825	363 651	373 372	384 070	393 406	402 464	412 117	422 422	433 444			
Non-residential income	82 180	84 235	86 762	89 798	93 390	97 593	102 277	107 493	113 238	119 756	126 941			
Income from Rates	174 669	174 669	174 669	174 669	174 669	174 669	174 669	174 669	174 669	174 669	174 669			
Disposal Charges	182	185	189	192	197	202	207	213	219	227	234			
ES Subsidies	232451	247426	293106	232451	232451	232451	232451	232451	232451	232451	232451			
Other income	21307	21307	21307	21307	21307	21307	21307	21307	21307	21307	21307			
<b>Total operating income</b>	850 391	874 649	930 857	882 068	895 386	910 292	924 317	938 598	954 062	970 832	989 047			
								938 598						
<b>Expenses</b>	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022			
Operating costs	759 540	769 286	779 367	790 188	801 807	814 293	827 494	841 474	856 304	872 065	888 849			
Provision for bad debt	274 920	329 053	333 277	337 743	341 105	345 719	350 566	356 187	362 082	368 276	374 798			
Contributions to Reserves	8 300	8 300	8 300	8 300	8 300	8 300	8 300	8 300	8 300	8 300	8 300			
Depreciation	84 493	84 493	84 493	84 493	84 493	84 493	84 493	84 493	84 493	84 493	84 493			
<b>Total operating expenses</b>	1 127 253	1 191 132	1 205 437	1 220 724	1 235 705	1 252 805	1 270 954	1 290 454	1 311 179	1 333 133	1 356 440			
Net Operating Income / (Loss)	-276 862	-316 483	-274 580	-338 655	-340 319	-342 513	-346 537	-351 857	-357 117	-362 301	-367 393			
Interest Paid	6 875	6 875	7 949	8 920	6 181	5 879	5 478	6 342	7 079	7 674	8 114			
<b>Net Income / (Loss)</b>	-283 737	-323 358	-282 528	-347 575	-346 501	-348 393	-352 015	-358 199	-364 196	-369 976	-375 507			
Retained Earnings	-283 737	-323 358	-282 528	-347 575	-346 501	-348 393	-352 015	-358 199	-364 196	-369 976	-375 507			
<b>Cash flow</b>														
<b>Net income</b>		-323 358	-282 528	-347 575	-346 501	-348 393	-352 015	-358 199	-364 196	-369 976	-375 507			
Add back interest		6 875	7 949	8 920	6 181	5 879	5 478	6 342	7 079	7 674	8 114			
Add back provisions for bad debt		329 053	333 277	337 743	341 105	345 719	350 566	356 187	362 082	368 276	374 798			

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